RBI Grade B 30 Quantitative Aptitude Questions With Answers PDF

Q1. A can complete $\frac{1}{8}th$ of a work in $\frac{2}{3}$ days, B complete $\frac{1}{3}rd$ of the work in 4 days and C complete $\frac{1}{6}th$ of the work in $\frac{5}{3}$ days. If all three together started the work and after 1.5 days A and B left the work while C works for Y days. After Y days, C also left the work and B joins again & complete the remaining work in $\frac{69}{40}$ days. Find the value of Y.

(a) 7
(b) 3
(c) 5
(d) 9
(e) 11

Ans.(b)

A complete work in $= \frac{2\times8}{3} = \frac{16}{3}\ days$

B complete work in $= 4 \times 3 = 12\ days$

C complete work in $= 6 \times \frac{5}{3} = 10\ days$

Let total work L.C.M. $(\frac{16}{3}, 12, 10) = 240$ units

So, efficiency of A $= \frac{240\times3}{16} = 45\ unit/day$

Efficiency of B $= \frac{240}{12} = 20\ unit/day$

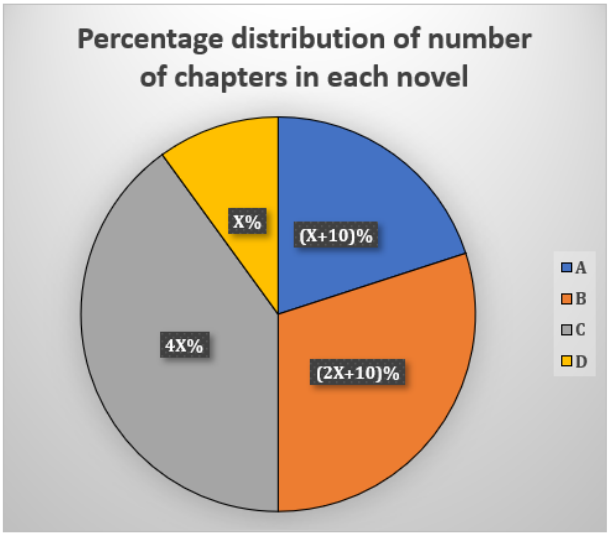
Efficiency of A $= \frac{240}{10} = 24\ unit/day$

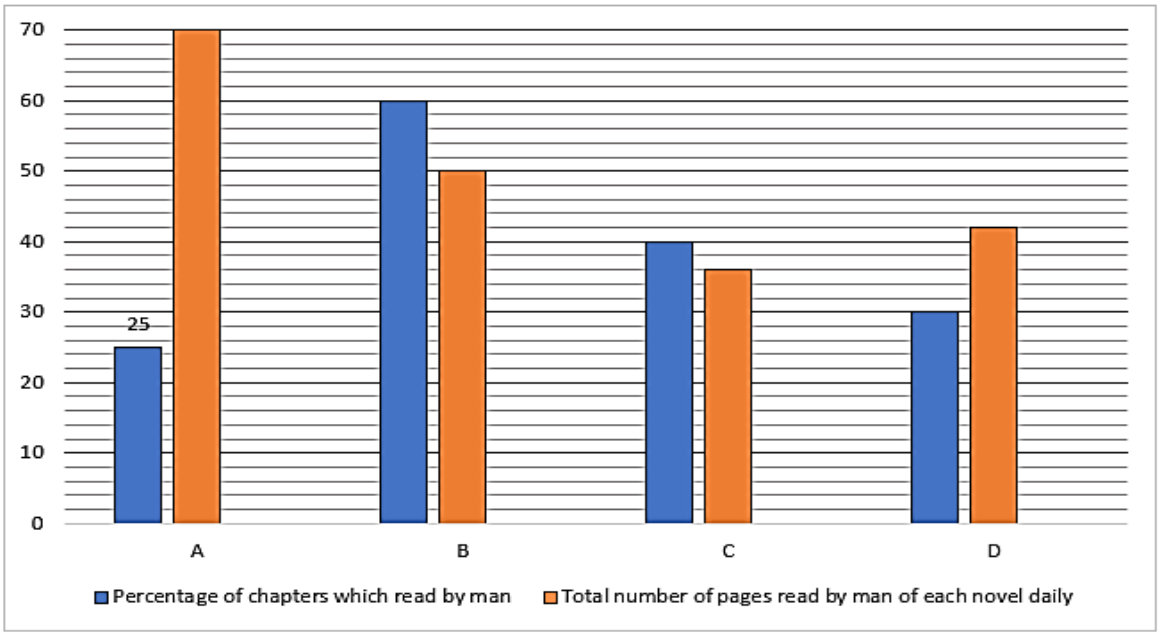
Number of units of work done by A, B and C together in 1.5 days
$= 1.5 \times (45 + 20 + 24) = 133.5\ units$

Total units of work done by B alone in $\frac{69}{40}$ days $= 20 \times \frac{69}{40} = 34.5\ units$

So, Y $= \frac{240-(133.5+34.5)}{24} = \frac{72}{24} = 3$

Directions (2-7): A man have four (A, B, C and D) different novels and each novel are distributed in some chapters (not equal necessarily). Given pie chart shows percentage distribution of total number of chapters in each novel out of total number of chapters in all four novels and bar graph shows percentage of chapter which read by man and it also shows number of pages read by man of each novel daily. Read the data carefully and answer the questions.





Note: (i) Total 'Y' number of chapters in all four novels and the average number of chapters which read by man of novel A & D is (Y-768), while each chapter of each novel consist 40 pages.
(ii). Every day, man read each novel in numerical order. For example, man read 1st chapter of novel A and after reading 40 pages & when first chapter is completed, then he read (70-40) = 30 pages of 2nd chapter of novel A and when his daily quota of number of pages of novel A completed, after that he starts reading novel B so on. Next day the man repeated the same process.

Q2. Find in how many days the man will read all the chapters of novel A?
(a) 17 days
(b) 22 days
(c) 23 days
(d) 21 days
(e) 25 days
Ans.(c)
Sol.

Percentage distribution of number of chapters in each novel
X+X+10+2X+10+4X= 100
8X=80
X =10
Given, total number of chapters in all four novels = Y
And average number of chapters which read by man of novel A & D is = (Y−768)
So,

$$(Y\times\frac{20}{100}\times\frac{25}{100}+Y\times\frac{10}{100}\times\frac{30}{100})=2\times(Y-768)$$

$$\frac{8Y}{100}=2Y-1536$$

$$192Y=153600$$

$$Y=800$$

So, total number chapters in all four novels = 800

Total chapters which read by man of novel A = $800 \times \frac{20}{100} \times \frac{25}{100} = 40$
Total number of pages in 40 chapters of novel A = $40 \times 40 = 1600$
Given, daily number of pages read by man of novel A = 70
In 22 days, total pages of novel A read by man = $70 \times 22 = 1540$
Remaining pages = 1600 – 1540 = 60
So, on 23rd day man will finish the remaining pages of novel A
So, required days = 22 + 1 = 23 days

Q3. Find the difference between number of days taken by man to read all chapters of novel B and that of novel C?
(a) 28 days
(b) 27 days
(c) 25 days
(d) 26 days
(e) 22 days
Ans.(b)
Sol.
Percentage distribution of number of chapters in each novel
X+X+10+2X+10+4X= 100
8X=80
X =10
Given, total number of chapters in all four novels = Y
And average number of chapters which read by man of novel A & D is = (Y−768)
So,
$(Y\times \frac{20}{100} \times \frac{25}{100} + Y \times \frac{10}{100} \times \frac{30}{100}) = 2 \times (Y - 768)$
$\frac{8Y}{100} = 2Y - 1536$
192Y = 153600
Y = 800
So, total number chapters in all four novels = 800

Total chapter which read by man of novel B = $800 \times \frac{30}{100} \times \frac{60}{100} = 144$
Total number of pages in 144 chapters of novel B = $144 \times 40 = 5760$
Given, daily number of pages read by man of novel B = 50
Total number of pages read by man in 115 days = $115 \times 50 = 5750$
Remaining pages (5760 – 5750) =10 pages of novel B read by man on 116th day
So, total days in which man read total 144 chapters of novel B = 116
Total chapter which read by man of novel C = $800 \times \frac{40}{100} \times \frac{40}{100} = 128$
Total number of pages in 128 chapters of novel C = $128 \times 40 = 5120$
Given, daily number of pages read by man of novel C = 36
Total pages read by man in 142 days = $142 \times 36 = 5112$
Remaining pages (5120 −5112) = 8 pages of novel C read by man on 143th day
So, required difference = 143 – 116 = 27 days

Q4. How many chapters of novel D was completely read by man till 12th day?

(a) 13 chapters
(b) 12 chapters
(c) 11 chapters
(d) 14 chapters
(e) 20 chapters

Ans.(b)

Sol.

Percentage distribution of number of chapters in each novel

X+X+10+2X+10+4X= 100

8X=80

X =10

Given, total number of chapters in all four novels = Y

And average number of chapters which read by man of novel A & D is = (Y−768)

So,

$(Y\times \frac{20}{100}\times \frac{25}{100}+Y\times \frac{10}{100}\times \frac{30}{100})=2\times(Y-768)$

$\frac{8Y}{100}=2Y-1536$

192Y = 153600

Y = 800

So, total number chapters in all four novels = 800

Total pages in each chapter of novel D = 40

Given, daily number of pages read by man of novel D = 42

Total pages read by man till 12^{th} day = $42\times 12=504$

So, total chapters which completed read by man till 12^{th} day = $\frac{504}{40}=12.6=12$ chapters

Q5. The man breaks this process and after he complete the number of pages of novel B he starts reading novel D and skip novel C daily. If man continue it till the time in which he read all the given chapters of novel D, then find minimum number of days required (note: total number of pages read by man in one day = number of pages read by man of novel C and D together)?

(a) 15
(b) 11
(c) 14
(d) 12
(e) 13

Ans.(e)

Sol.

Percentage distribution of number of chapters in each novel

X+X+10+2X+10+4X= 100

8X=80

X =10

Given, total number of chapters in all four novels = Y
And average number of chapters which read by man of novel A & D is = (Y−768)
So,
$(Y\times \frac{20}{100}\times \frac{25}{100}+Y\times \frac{10}{100}\times \frac{30}{100})=2\times(Y-768)$
$\frac{8Y}{100}=2Y-1536$
$192Y=153600$
$Y=800$
So, total number chapters in all four novels = 800

Total chapters of novel D read by man = $800\times \frac{10}{100}\times \frac{30}{100}=24$
Total number of pages in 24 chapters of novel D = $24\times 40=960$
Now, total number of pages man read daily of novel D = 36 + 42 = 78
In total 12 days, total number of pages of novel D read by man = $78\times 12=936$
Remaining (960 − 936) = 24 pages of novel D read by man on 13th day
So, required minimum days = 12 + 1 = 13 days

Q6. After four days, find the number of chapters which completely read by man.
(a) 19
(b) 17
(c) 21
(d) 23
(e) 18
Ans.(a)
Sol.
Percentage distribution of number of chapters in each novel
X+X+10+2X+10+4X= 100
8X=80
X =10
Given, total number of chapters in all four novels = Y
And average number of chapters which read by man of novel A & D is = (Y−768)
So,
$(Y\times \frac{20}{100}\times \frac{25}{100}+Y\times \frac{10}{100}\times \frac{30}{100})=2\times(Y-768)$
$\frac{8Y}{100}=2Y-1536$
$192Y=153600$
$Y=800$
So, total number chapters in all four novels = 800

For novel A.
Total number of pages in each chapter = 40
Given, daily number of pages read by man of novel = 70
Total number of pages of novel A read by man in four days = $70\times 4=280$
So, total number of chapters of novel A read by man in four days = $280\times \frac{1}{40}=7$

For novel B.

Total number of pages in each chapter = 40

Given, daily number of pages read by man of novel = 50

Total number of pages of novel B read by man in four days = $50 \times 4 = 200$

So, total number of chapters of novel A read by man in four days $=200 \times \frac{1}{40} = 5$

For novel C.

Total number of pages in each chapter = 40

Given, daily number of pages read by man of novel = 36

Total number of pages of novel C read by man in four days = $36 \times 4 = 144$

So, total number of chapters of novel C read by man in four days = $144 \times \frac{1}{40} = 3.6$

And total chapter of novel C which completely read by man after four days = 3

For novel D.

Total number of pages in each chapter = 40

Given, daily number of pages read by man of novel = 42

Total number of pages of novel D read by man in four days = $42 \times 4 = 168$

So, total number of chapters of novel C read by man in four days = $168 \times \frac{1}{40} = 4.2$

And total chapter of novel C which completely read by man after four days = 4

So, total chapter which completely read my man after four days = (7+5+3+4) =19

Q7. Find the average number of complete chapters of novel B, C and D read by man?

(a) 91.44

(b) 94.66

(c) 98.66

(d) 96.66

(e) 99.22

Ans.(c)

Sol.

Percentage distribution of number of chapters in each novel

X+X+10+2X+10+4X= 100

8X=80

X =10

Given, total number of chapters in all four novels = Y

And average number of chapters which read by man of novel A & D is = (Y−768)

So,

$(Y\times \frac{20}{100}\times \frac{25}{100} + Y \times \frac{10}{100}\times \frac{30}{100}) = 2 \times (Y - 768)$

$\frac{8Y}{100} = 2Y - 1536$

$192Y = 153600$

$Y = 800$

So, total number chapters in all four novels = 800

$$\text{Req. average} = \frac{800\times\frac{30}{100}\times\frac{60}{100}+800\times\frac{40}{100}\times\frac{40}{100}+800\times\frac{10}{100}\times\frac{30}{100}}{3}$$

$$= \frac{144 + 128 + 24}{3} = \frac{296}{3} = 98.66$$

Q8. The still water speed of two boats A & B are 2X+10 & Y-6 kmph respectively. The speed of the current in which these boats are travelling is half the speed of boat A in still water. Downstream speed of boat A is 4Z kmph more than downstream speed of boat B. Find which of the option is correct about the upstream speed (in kmph) of boat B.

(a) 3X - 4Z + 15
(b) 2X - 4Z + 15
(c) X - 4Z + 5
(d) X - 5Z + 15
(e) X - 6Z + 15

Ans.(c)

Sol. Speed of boat A in still water = 2X+10 kmph
Speed of boat B in still water = Y-6 kmph
Speed of current = X+5 kmph
ATQ,
2X+10 + (X+5) – [Y-6+(X+5)] = 4Z
2X – Y + 16 = 4Z
Y = 2X - 4Z + 16
Upstream speed of boat B = Y-6 – (X+5)
= Y-X-11 (Put Y = 2X-4Z+16)
= 2X-4Z+16 – X -11
= X-4Z+5

Directions (9-11): Solve the given equations and answer the question given below.

I: $px^2 - 19x + 21 = 0$
II: $y^2 - qy + 35 = 0$
Note: (i) Both p, q are positive integer with q>p.
(ii) One of the roots of the equation II is 5.
(iii) One of the roots of equation I is four less than that of equation II.

Q9. Which of the following statement is true regarding roots of the equation –

$\boldsymbol{a^2 - \frac{a}{3} + \frac{1}{48} = 0}$

(a) Roots of the equation are p-5 and q+2
(b) Roots of the equation are p + q and q/2
(c) Roots of the equation are 1/p and 1/q
(d) Roots of the equation are 2p/5 and q^2
(e) Roots of the equation are p × q and p^2

Ans.(c)

Sol. One of the roots of the equation II is 5. So, y = 5
$5^2 - 5q + 35 = 0$
q = 12
$y^2 - 12y + 35 = 0$
(y-7) (y-5) = 0
y = 7, 5

Given, roots of equation I either 3 (7-4) or 1 (5-4).
If x= 1
$p(1)^2 - 19(1) + 21 = 0$
$p - 19 + 21 = 0$
$p = -2$
p can't be -2
If x= 1
$p(3)^2 - 19(3) + 21 = 0$
$9p = 36$
p = 4
$4x^2 - 19x + 21 = 0$
$(x - 3)(4x - 7) = 0$
x = 3, 7/4
$a^2 - \frac{a}{3} + \frac{1}{48} = 0$
$48a^2 - 16a + 1 = 0$
$48a^2 - 12a - 4a + 1 = 0$
$(4a - 1)(12a - 1) = 0$
$a = 1/4, 1/12$

Q10. What are the roots of the equation
$\left(\frac{p+q}{2p}\right) b^2 - 13b - \frac{4pq+228}{5} = 0$
I. 21/2
II. 4
III. -4
IV. -21/2
(a) II & III
(b) II & IV
(c) I & IV
(d) I & III
(e) I & II
Ans.(d)
Sol. One of the roots of the equation II is 5. So, y = 5
$5^2 - 5q + 35 = 0$
q = 12
$y^2 - 12y + 35 = 0$
$(y-7)(y-5) = 0$
y = 7, 5
Given, roots of equation I either 3 (7-4) or 1 (5-4).
If x= 1
$p(1)^2 - 19(1) + 21 = 0$
$p - 19 + 21 = 0$
$p = -2$
p can't be -2

If x= 1
$p(3)^2 - 19(3) + 21 = 0$
$9p = 36$
p = 4
$4x^2 - 19x + 21 = 0$
$(x - 3)(4x - 7) = 0$
x = 3, 7/4
$\left(\frac{p+q}{2p}\right) b^2 - 13b - \frac{4pq+228}{5} = 0$
$2b^2 - 13b - 84 = 0$
$2b^2 - 21b + 8b - 84 = 0$
$b(2b - 21) + 4(2b - 21) = 0$
$(b + 4)(2b - 21) = 0$
b = - 4, 21/2

Q11. Find the difference between the largest root of equation I and smallest root of equation II.
(a) q – 2p
(b) p/2 – q/12
(c) 3(q + p)
(d) q ÷ p
(e) q/2 - p
Ans.(e)
Sol. One of the roots of the equation II is 5. So, y = 5
$5^2 – 5q + 35 = 0$
q = 12
$y^2 - 12y + 35 = 0$
$(y-7)(y-5) = 0$
y = 7, 5
Given, roots of equation I either 3 (7-4) or 1 (5-4).
If x= 1
$p(1)^2 - 19(1) + 21 = 0$
$p – 19 + 21 = 0$
p = -2
p can't be -2
If x= 1
$p(3)^2 - 19(3) + 21 = 0$
$9p = 36$
p = 4
$4x^2 - 19x + 21 = 0$
$(x - 3)(4x - 7) = 0$
x = 3, 7/4
Largest root of equation I = 3
Smallest root of equation II = 5
Required difference = 5 – 3 = 2

Directions (12-15): Read the given data carefully and answer the questions given below.
(i) The time taken by pipes A, B and C together to fill 20% of a tank + **T** hours = The time taken by pipe D and E together to fill 3/10 th of the same tank.
(ii) The efficiency of pipe F is 200/3% more than the efficiency of pipe B and efficiency of pipe E is 40% more than efficiency of pipe A.
(iii) Pipe A alone can fill the same tank in **X** hours, while pipe D and B together fill **P**% of the tank in 18 hours.
(iv) The percentage of tank filled by A and C together in 12 hours is **Y**% and pipes A and E together can fill 4/5 th of the tank in 14 hours.
(v) Pipes B, D and E together can fill the whole tank in **N** hours, while pipes F, C and D individually can fill the same tank in 24 hours, 56 hours and 60 hours respectively.

Q12. If Anmol can do 20% of a task in 2T days, then find time taken by him to complete the whole task?
(a) 20 days
(b) 30 days
(c) 24 days
(d) 36 days
(e) 40 days
Ans.(b)
Sol. Let pipe A alone can fill the tank in 'a' hour
Similarly, Pipe B alone can fill the tank in 'b' hour
Pipe C alone can fill the tank in 'c' hour
Pipe D alone can fill the tank in 'd' hour
Pipe E alone can fill the tank in 'e' hour
Pipe F alone can fill the tank in 'f' hour
Given, Efficiency of pipe F is
$66\frac{2}{3}\%$
more than efficiency of pipe B and pipe E is 40% more than efficiency of pipe A
So, ratio of efficiency of pipe F and pipe B = 100 : 60 = 5 : 3
Therefore, ratio of time taken of pipe B and F = 5:3
And, ratio of efficiency of pipe E and A = 140 : 100 = 7 : 5
Therefore, ratio of time taken of pipe A and E = 7:5
Let, b = 5n hours
f = 3n hours
And, a = 7y hours
e = 5y hours
Given, Pipe F and pipe D alone can fill the tank in 24 hours and 60 hours respectively
So, 3n = 24 hours
n = 8 hours
So, $b = 5 \times 8 = 40$ *hours*

Also given, A & E together can fill $\frac{4}{5}th$ of the tank in fourteen hours

So, $(\frac{1}{5y}+\frac{1}{7y})\times 14=\frac{4}{5}$

$\frac{7+5}{35y}=\frac{4}{70}$

y = 6 hours

Now, Time taken by pipe A, B & C together to fill $\frac{1}{5}th$ of a tank = $\frac{1}{5}\times\frac{1}{(\frac{1}{42}+\frac{1}{40}+\frac{1}{56})}$ = 3 hours

And, time taken by pipe D & E together to fill $\frac{3}{10}th$ of the tank = $\frac{3}{10}\times\frac{1}{(\frac{1}{60}+\frac{1}{80})}$ = 6 hours

So, T = 6 – 3 = 3 hours

Anmol can 20% of the tank = $2\times 3=6\ days$

So, required days = $6\times\frac{100}{20}=30$ days

Q13. Find the value of 2X?

(a) 84

(b) 42

(c) 64

(d) 72

(e) 88

Ans.(a)

Sol. Let pipe A alone can fill the tank in 'a' hour

Similarly, Pipe B alone can fill the tank in 'b' hour

Pipe C alone can fill the tank in 'c' hour

Pipe D alone can fill the tank in 'd' hour

Pipe E alone can fill the tank in 'e' hour

Pipe F alone can fill the tank in 'f' hour

Given, Efficiency of pipe F is $66\frac{2}{3}\%$ more than efficiency of pipe B and pipe E is 40% more than efficiency of pipe A

So, ratio of efficiency of pipe F and pipe B = 100 : 60 = 5 : 3

Therefore, ratio of time taken of pipe B and F = 5:3

And, ratio of efficiency of pipe E and A = 140 : 100 = 7 : 5

Therefore, ratio of time taken of pipe A and E = 7:5

Let, b = 5n hours

f = 3n hours

And, a = 7y hours

e = 5y hours

Given, Pipe F and pipe D alone can fill the tank in 24 hours and 60 hours respectively

So, 3n = 24 hours

n = 8 hours

So, $b=5\times 8=40\ hours$

Also given, A & E together can fill $\frac{4}{5}th$ of the tank in fourteen hours

So, $(\frac{1}{5y}+\frac{1}{7y})\times 14=\frac{4}{5}$

$\frac{7+5}{35y}=\frac{4}{70}$

y = 6 hours

Now, Time taken by pipe A, B & C together to fill $\frac{1}{5}th$ of a tank $=\frac{1}{5}\times\frac{1}{(\frac{1}{42}+\frac{1}{40}+\frac{1}{56})}=3$ hours

And, time taken by pipe D & E together to fill $\frac{3}{10}th$ of the tank $=\frac{3}{10}\times\frac{1}{(\frac{1}{60}+\frac{1}{80})}=6$ hours

So, T = 6 – 3 = 3 hours

Value of 2X = 2 ×7 ×6=84

Q14. What should come in the place of P?

(a) 80

(b) 60

(c) 50

(d) 75

(e) 25

Ans.(d)

Sol. Let pipe A alone can fill the tank in 'a' hour

Similarly, Pipe B alone can fill the tank in 'b' hour

Pipe C alone can fill the tank in 'c' hour

Pipe D alone can fill the tank in 'd' hour

Pipe E alone can fill the tank in 'e' hour

Pipe F alone can fill the tank in 'f' hour

Given, Efficiency of pipe F is $66\frac{2}{3}\%$ more than efficiency of pipe B and pipe E is 40% more than efficiency of pipe A

So, ratio of efficiency of pipe F and pipe B = 100 : 60 = 5 : 3

Therefore, ratio of time taken of pipe B and F = 5:3

And, ratio of efficiency of pipe E and A = 140 : 100 = 7 : 5

Therefore, ratio of time taken of pipe A and E = 7:5

Let, b = 5n hours

f = 3n hours

And, a = 7y hours

e = 5y hours

Given, Pipe F and pipe D alone can fill the tank in 24 hours and 60 hours respectively

So, 3n = 24 hours

n = 8 hours

So, $b=5\times 8=40\ hours$

Also given, A & E together can fill $\frac{4}{5}th$ of the tank in fourteen hours

So, $(\frac{1}{5y}+\frac{1}{7y})\times 14=\frac{4}{5}$

$\frac{7+5}{35y}=\frac{4}{70}$

y = 6 hours

Now, Time taken by pipe A, B & C together to fill $\frac{1}{5}th$ of a tank = $\frac{1}{5} \times \frac{1}{\left(\frac{1}{42}+\frac{1}{40}+\frac{1}{56}\right)}$ = 3 hours

And, time taken by pipe D & E together to fill $\frac{3}{10}th$ of the tank = $\frac{3}{10} \times \frac{1}{\left(\frac{1}{60}+\frac{1}{80}\right)}$ = 6 hours

So, T = 6 – 3 = 3 hours

Percentage of tank filled by D & B together in 18 hours =$\left(\frac{18}{60}+\frac{18}{40}\right) \times 100$

$= \frac{36+54}{120} \times 100 = 75\%$

Q15. Find the value of Y/P?

(a) 1/3
(b) 3/4
(c) 2/5
(d) 1/2
(e) 2/3

Ans.(e)

Sol. Let pipe A alone can fill the tank in 'a' hour
Similarly, Pipe B alone can fill the tank in 'b' hour
Pipe C alone can fill the tank in 'c' hour
Pipe D alone can fill the tank in 'd' hour
Pipe E alone can fill the tank in 'e' hour
Pipe F alone can fill the tank in 'f' hour

Given, Efficiency of pipe F is $66\frac{2}{3}\%$ more than efficiency of pipe B and pipe E is 40% more than efficiency of pipe A

So, ratio of efficiency of pipe F and pipe B = 100 : 60 = 5 : 3
Therefore, ratio of time taken of pipe B and F = 5:3
And, ratio of efficiency of pipe E and A = 140 : 100 = 7 : 5
Therefore, ratio of time taken of pipe A and E = 7:5

Let, b = 5n hours
f = 3n hours
And, a = 7y hours
e = 5y hours

Given, Pipe F and pipe D alone can fill the tank in 24 hours and 60 hours respectively
So, 3n = 24 hours
n = 8 hours
So, b = 5 × 8 = 40 *hours*

Also given, A & E together can fill $\frac{4}{5}th$ of the tank in fourteen hours

So, $\left(\frac{1}{5y}+\frac{1}{7y}\right) \times 14 = \frac{4}{5}$

$\frac{7+5}{35y} = \frac{4}{70}$

y = 6 hours

Now, Time taken by pipe A, B & C together to fill $\frac{1}{5}th$ of a tank $= \frac{1}{5} \times \frac{1}{\left(\frac{1}{42}+\frac{1}{40}+\frac{1}{56}\right)} = 3$ hours

And, time taken by pipe D & E together to fill $\frac{3}{10}th$ of the tank $= \frac{3}{10} \times \frac{1}{\left(\frac{1}{60}+\frac{1}{80}\right)} = 6$ hours

So, T = 6 – 3 = 3 hours

Percentage of tank filled by A & C together in twelve hours $= 12 \times \left(\frac{1}{56}+\frac{1}{42}\right) \times 100 = 50\%$

So, Value of $\frac{Y}{P} = \frac{50}{75} = \frac{2}{3}$

Q16. There are two quantities I and II are given below. Find the correct relationship among these three quantiles.

'A' is natural number less than 50 and divisible by six but not divisible by eight, while 'B' is a prime number less than ten.

Quantity I – What will be probability of that (square of 'A' – product of A & B) > 600.

Quantity II – What will be probability of (A – B) is divisible by 4.

(a) Quantity I > Quantity II

(b) Quantity II > Quantity I

(c) Quantity I ≥ Quantity II

(d) Quantity II ≥ Quantity I

(e) Quantity I = Quantity II or relation can't be established

Ans.(a)

Sol.

Natural number less than 50 and divisible by 6 = 6, 12, 18, 24, 30, 36, 42 & 48

But not divisible by 8 = 6, 12, 18, 30, 36 & 42

So, A can be (6, 12, 18, 30, 36 & 42)

And B can be (2, 3, 5 & 7)

Quantity I – (Square of 'A' – product of A & B) > 600, only possible when A ≥ 30 ($\because 24^2 = 576 < 600$)

Satisfying values A = (30, 36, 42)

B = (2, 3, 5, 7)

Total satisfying outcomes = 3 × 4 = 12

Total outcomes = 6 × 4 = 24

Required probability $= \frac{12}{24} = 0.5$

Quantity II – Satisfying values of B = (2)

($\because$ *all values of A are even and required difference is divisible by* 4 *which is only possible when an even value subtracted from another even value*)

In order to get difference divisible by 4

Satisfying values of A = (6, 18, 30, 42)

Total satisfying outcomes = 1 × 4 = 4

Total outcomes = 6 × 4 = 24

Required probability $= \frac{4}{24} = 0.167$

Clearly, **Quantity I > Quantity II**

Q17. The total length of train A and B is 20x meters, in which length of train B is 65%. The speed B is 100% more than that of train A. Trains A and B started entering a tunnel from opposite directions at the same time and crossed the tunnel completely after 188 seconds and 106 seconds respectively. Find much time after entering the tunnel did the two trains cross each other completely?

(a) 120 seconds
(b) 100 seconds
(c) 60 seconds
(d) 40 seconds
(e) 80 seconds

Ans.(e)

Sol. Information Given:

Total length of train A and B = 20x meters

Length of train B = 65% of sum length of train A and B

Speed of train B = 2 times of speed of train A (Given, speed B is 100% more than that of train A)

Formula Used:

Time =

$\text{Time} = \frac{\text{Distance}}{\text{Speed}}$

Explanation:

Length of Train B =

$20x \times \frac{65}{100} = 13x\text{meters}$

So, length of train A = 20x - 13x = 7x meters

Let length of tunnel = 'd' meters

Let speed of train A = y meters/sec.

So, speed of train B = 2y meters/sec.

ATQ,

$\frac{\frac{7x+d}{y}}{\frac{13x+d}{2y}} = \frac{188}{106}$

371x +53d = 611x+47d

6d = 240x

d = 40x

When both train A and B crossing each other, combined distance travelled = Length of the tunnel + Combined length of both the trains A and B

So, combined distance travelled = 20x + 40x = 60x meters

Total distance travelled by train A = 7x + d = 7x + 40x =47x meters

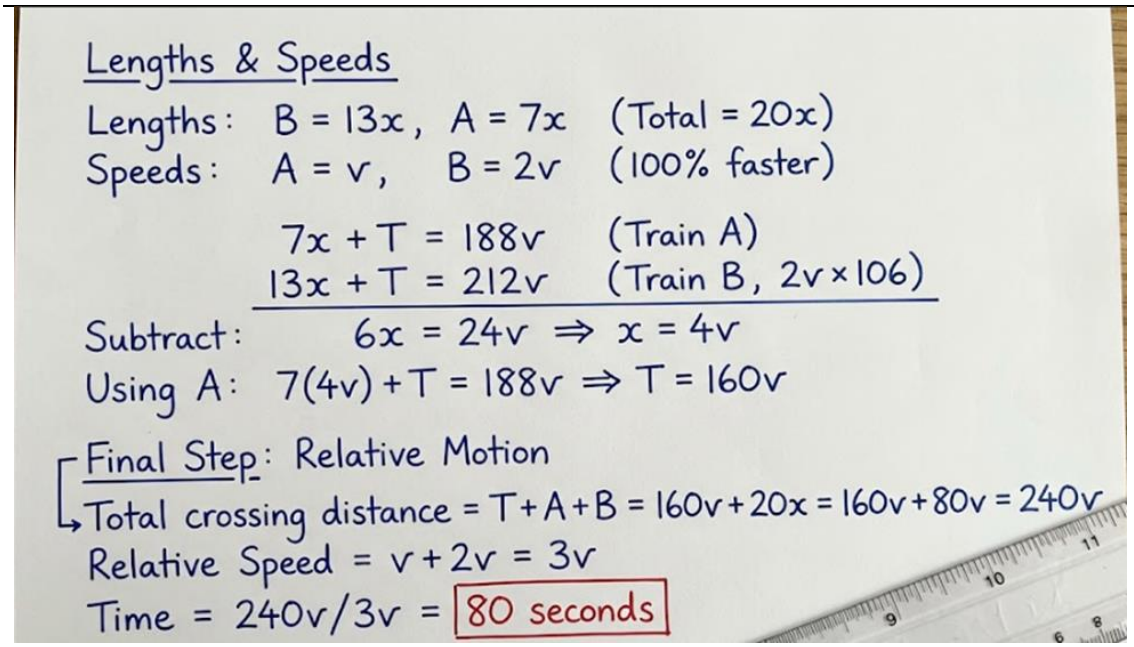
And, time taken by train A to cover 47x meters distance =188 seconds

Required answer =

$188 \times \frac{y}{y+2y} \times \frac{60x}{47x}$

= 80 seconds

Exam Hall Approach



Q18. The question below consists four blanks followed by four number series (P), (Q), (R) and (S). Solve the number series for the value of A, B, C & D and arrange it in a proper sequence such that it satisfy the banks given in the question given below.

A dishonest seller marks up his wheat (in gram) by _____% and allows the _____% discount while selling. Shopkeeper cheated the customer by giving him _____% less quantity and he also cheated the wholesaler by purchasing _____% more quantity at the same price. In this process he made an overall profit of 87.5%.

(P): 4800, 600, 100, 25, A

(Q): B, 65, 95, 120, 140, 155

(R): C, 24, 30, 39, 53, 74

(S): 4, 9, 16, D, 36, 49

(a) ABCD

(b) CABD

(c) ACBD

(d) Both (a) and (c)

(e) Both (a) and (b)

Ans.(b)

Sol.

Pattern of the series (P):

4800 ÷8 600, ÷6 100, ÷4 25, ÷2 **12.5**,

A = 12.5

Pattern of the series (Q)

30, +35 65, +30 95, +25 120, +20 140, +15 155

B = 30

Pattern of the series (R)

20,	24,	30,	39,	53,	74
	+4	+6	+9	+14	+21
		+2	+3	+5	+7

C = 20

Pattern of the series (S)

4,	9,	16,	**25,**	36,	49
2^2	3^2	4^2	5^2	6^2	7^2

D = 25

From (a):

ABCD

A= 12.5%

B = 30%

C = 20%

D = 25%

ATQ,

Let cost price of 1 kg wheat = Rs.100

Marked price = $\frac{112.5}{100} \times 100 = 112.5$

Selling price = $112.5 \times \frac{70}{100} = 78.75$

Selling quantity by shopkeeper to costumer = $1000\ gm \times \frac{80}{100} = 800\ gm$

Selling price of 800 gram = 78.75

Selling price of 1000 gram = $\frac{78.75}{800} \times 1000 = 98(approx)$

Buying quantity by whole seller = $1000 \times \frac{125}{100} = 1250\ gm$

Selling price of 1000 gram = $\frac{98}{1000} \times 1250 = 123(approx)$

Overall profit% = 23%

From (b):

CABD

A= 12.5%

B = 30%

C = 20%

D = 25%

ATQ,

Let cost price of 1 kg wheat = Rs.100

Marked price = $\frac{120}{100} \times 100 = 120$

Selling price = $87.5 \times \frac{120}{100} = 105$

Selling quantity by shopkeeper to costumer = $1000\ gm \times \frac{70}{100} = 700\ gm$

Selling price of 700 gram = 105

Selling price of 1000 gram = $\frac{105}{700} \times 1000 = 150$

Buying quantity by whole seller = $1000 \times \frac{125}{100} = 1250\ gm$

Selling price of 1250 gram = $\frac{150}{1000} \times 1250 = 187.5$

Overall profit% = 87.5%

Rest options are eliminated

Q19. A borrowed a loan of Rs. 420000 from a bank at an interest rate of 10% per annum, compounded annually. The loan was repaid in two equal instalments, the first after one year and the second after another year. Then each installment (in Rs) is.

(a) 242000
(b) 121000
(c) 110000
(d) 10000
(e) 14500

Ans.(a)

Sol. Information Given:

Principal amount (P)= 420000 Rs.
Interest rate =10% per annum (compounded annually).
Loan is to be repaid in two equal instalments, with one payment each year.

Formula Used:

For a loan compounded annually and repaid in equal instalments, the instalment amounts can be calculated using the formula:

Instalment =

$$\frac{P\times(1+R)^n\times R}{(1+R)^n-1}$$

Where:

P is the principal amount,
R is the annual interest rate (as a decimal),
n is the number of instalments.
In this case:
P=42000
R = 10/100 = 0.10
n=2

Explanation:

$$(1+R)^n = (1+0.10)^2 = 1.21$$

$$\text{So, Instalment} = \frac{420000\times1.21\times0.10}{1.21-1}$$

$$= \frac{420000\times0.121}{0.21}$$

$$= 242000 \text{ Rs}$$

Answer:

Each instalment is Rs **242000**

Alternate Method

Principal = 420000 Rs
Rate of interest for 1st year = 10%
Rate of interest for 2nd year = 10 + 10 + 10×10/100=21%
100<----------100×110%<----------100×121%
100 <----------110<----------121

100 +110 <--------121
210 <----------121
420000<----------x
x = 121/210×420000 = 242000

Q20. Each of the given question is followed by three statements A, B & C. You have to determine which statement (s) is/are sufficient/necessary to answer the question and mark answer accordingly.

Is $(bc-ab)$ even integer or odd integer if a,b, and c are integers?

A. a,b and c are in arithmetic progression.

B. *Set* $\{a,b,c\}$ is co-prime and a,b and c are consecutive integers.

C. a,b and c all three are prime numbers.

(a) Either statement 'A' or 'B' alone is sufficient to answer the question
(b) Either statement 'B' or 'C' alone is sufficient to answer the question
(c) Either statement 'C' or 'A' alone is sufficient to answer the question
(d) Any of two statements are sufficient to answer the question
(e) Any one of them is sufficient to answer the question

Ans.(a)

Sol.

From A,
a, b and c are in A.P
Let common difference = 'd' and $\Rightarrow a = b - d$
And $c = b + d$
$(bc - ab) = b^2 + bd - b^2 + bd = 2bd$
$\Rightarrow (bc - ab)$ is divisible by 2
From B,
Set $\{a, b, c\}$ is coprime
all three have '1' as common multiple
And they are consecutive numbers
So, either b is even or a and c are both even.
In both cases –
$b(c - a) =$ even
From C,
All three are prime numbers but we can't say whether in these prime numbers 2 is taken or not.
And if 2 is taken then b = 2 or not.
So, in some cases $(bc - ab)$ is divisible by 2 and in some cases $(bc - ab)$ is not divisible by 2.
Correct conclusion cannot be inferred from statement 'C' alone
So, either statement 'A' or 'B' alone is sufficient to give answer of question.

Directions (21-22): Read the following information carefully & answer the questions given below.

A work can be completed by five members of group A in seven days, while 6 members of another group B can complete the same work in 5.6 days. Each group has at least two men & two women and the efficiency of a woman is 100/3% less than that of a man.

Q21. When both group work together, then find time taken by members of both groups to complete the same work.

(a) $3\frac{7}{19}\ days$

(b) $2\frac{8}{13}\ days$

(c) Cannot be determined

(d) $3\frac{1}{9}\ days$

(e) None of these

Ans.(d)

Sol.

Efficiency ratio man : woman = 3 : 2
Let efficiency of man & woman be 3x & 2x units/day respectively
each group has at least 2 men & 2 women
Considering group, A (5 members) = complete work in 7 days
There are two possible cases
Case (I) When 3 Men 2 Women
Total work = $(3 \times 3x + 2 \times 2x) \times 7 = 91x\ units$
Group B complete this work in 5.6 days
Work done in 1 day = 16.25x units
Group B = 2 Men + 2 Women + some men & women
Work by 2 Men & 2 Women per day = $2 \times 3x + 2 \times 2x = 10x\ units$
Remaining 6.25x units is to be completed by 2 members which may be man, woman or both
Minimum efficiency is of woman and man which is 2x & 3x units/day so remaining work can be completed by more than two members so this case is not possible.

Case (II) When 2 Men 3 Women
Total work = $(2 \times 3x + 3 \times 2x) \times 7 = 84x\ units$
Group B complete this work in 5.6 days
Work done in 1 day = 15x units
Group B = 2 Men + 2 Women + some men & women
Work by 2 Men & 2 Women per day = $2 \times 3x + 2 \times 2x = 10x\ units$
Remaining 5x units is to be completed by 2 members
So, only possible combination is 1 man & 1 woman

Group A = 2 Men 3 Women
Group B = 3 Men 3 Women
Total work = 84x units

$$\text{Required time} = \frac{84x}{5\times3x+6\times2x} = 3\frac{1}{9}\ days$$

Q22. If group A start working but after three days, they were dropped and group B was employed for the complete the remaining work. After another two days, two members of the group B left. Find minimum time required to finish the whole work.

(a) $6\frac{7}{11}$ days

(b) 7.3 days

(c) None of these

(d) Cannot be determined

(e) $4\frac{5}{9}$ days

Ans.(a)

Sol.

Efficiency ratio man : woman = 3 : 2
Let efficiency of man & woman be 3x & 2x units/day respectively
each group has at least 2 men & 2 women
Considering group, A (5 members) = complete work in 7 days
There are two possible cases
Case (I) When 3 Men 2 Women
Total work = $(3 \times 3x + 2 \times 2x) \times 7 = 91x$ *units*
Group B complete this work in 5.6 days
Work done in 1 day = 16.25x units
Group B = 2 Men + 2 Women + some men & women
Work by 2 Men & 2 Women per day = $2 \times 3x + 2 \times 2x = 10x$ *units*
Remaining 6.25x units is to be completed by 2 members which may be man, woman or both
Minimum efficiency is of woman and man which is 2x & 3x units/day so remaining work can be completed by more than two members so this case is not possible.

Case (II) When 2 Men 3 Women
Total work = $(2 \times 3x + 3 \times 2x) \times 7 = 84x$ *units*
Group B complete this work in 5.6 days
Work done in 1 day = 15x units
Group B = 2 Men + 2 Women + some men & women
Work by 2 Men & 2 Women per day = $2 \times 3x + 2 \times 2x = 10x$ *units*
Remaining 5x units is to be completed by 2 members
So, only possible combination is 1 man & 1 woman

Group A = 2 Men 3 Women
Group B = 3 Men 3 Women
Total work = 84x units

Work completed in 5 days = $(2 \times 3x + 3 \times 2x) \times 3 + (3 \times 3x + 3 \times 2x) \times 2 = 66x$ *units*
Remaining work = 84x − 66x = 18x units
2 members now left the work from group B (3 Men 3 Women)
Since required time is minimum which is only possible when 2 members who left are women
Required time = $3 + 2 + \frac{18x}{3\times3x+1\times2x} = 5 + 1\frac{7}{11} = 6\frac{7}{11}$ days

Q23. A cube is cut into 8 pieces equal pieces and a triangle is formed coinciding the side of the cube & of maximum height. The area of the triangle is 18 sq. cm. Find twice the volume (in cubic cm) of the sphere of maximum size that can be fit in the initial cube.

(a) None of these
(b) 120 π
(c) 320 π
(d) 288 π
(e) 145 π

Ans.(a)

Sol. Let the side be 2x unit of largest cube.
Each side of smaller cube = x
Base & Height of the triangle = x
1/2×x×x=18
x = 6
2x = 12
For maximum size sphere of radius r = 12/2 = 6 cm
Required volume =
$2 \times \frac{4}{3} \times \pi \times 6 \times 6 \times 6 = 576\pi$cubic cm

Directions (24-26): Read the following information carefully and answer the questions given below.

P, Q, and R started a business with investment in the ratio of 1:2:3, respectively. After two years, they received a profit of Rs 90X, which was distributed according to their profit-sharing ratio. Each of them kept Rs 5X of the profit and reinvested the remaining profit along with their initial investment in the business. After two more years, the total profit of Rs 3150 and the profit-sharing ratio of Q to R are 105:158, respectively. The total profit received by Q after four years is Rs 1650.

Q24. Find the investment (in Rs) of R during the last two years.

(a) 15800
(b) 12400
(c) 5200
(d) 10500
(e) None of these

Ans.(a)

Sol. Let the investment of P, Q and R be a, 2a and 3a respectively
The profit-sharing ratio of first two years
= a×2 :2a×2 :3a×2
= 1 : 2: 3
Profit of P = 90X × 1/6 = 15X
Profit of Q = 90X × 2/6 = 30X
Profit of R = 90X × 3/6 = 45X

Each of them kept Rs 5X of the profit
So, Amount of profit reinvested by
P = 15X – 5X = 10X
Q = 30X – 5X = 25X
R = 45X – 5X = 40X
The profit-sharing ratio of last two years
= (a+10X)×2 :(2a+25X)×2 :(3a+40X)×2
= a+10X : 2a+25X : 3a + 40X
Given,
$\frac{2a+25X}{3a+40X} = \frac{105}{158}$
316a+3950X=315a+4200X
a=250X
The profit-sharing ratio of last two years
= a+10X : 2a+25X : 3a + 40X
= 260X : 525X : 790X
= 52 : 105 : 158
Profit received by Q = $\frac{105}{52+105+158} \times 3150 = \text{Rs}1050$
Given, 1050 + 30X = 1650
30X = 600
X =20
a=250X
a = 5000
So, the initial investment of P, Q and R is Rs 5000, Rs 10000 and Rs 15000 respectively.
Total profit received by P = $15X + \frac{52}{52+105+158} \times 3150 = \text{Rs}820$
Total profit received by R = $45X + \frac{158}{52+105+158} \times 3150 = \text{Rs}2480$
Required answer = (3a+40X)=3(5000)+40(20)=Rs 15800

Q25. Which of the following statement/s is/are correct.
I. Total profit received by P > Rs 1000
II. Total profit received by R < Rs 2200
III. Profit of Q for first two years < 600
(a) Both I &III
(b) Both I & II
(c) All I, II & III
(d) None is correct
(e) Only II
Ans.(d)
Sol. Let the investment of P, Q and R be a, 2a and 3a respectively
The profit-sharing ratio of first two years
= a×2 :2a×2 :3a×2
= 1 : 2: 3

Profit of P = 90X×1/6=15X
Profit of Q = 90X×2/6=30X
Profit of R = 90X×3/6=45X
Each of them kept Rs 5X of the profit
So, Amount of profit reinvested by
P = 15X – 5X = 10X
Q = 30X – 5X = 25X
R = 45X – 5X = 40X
The profit-sharing ratio of last two years
= (a+10X)×2 :(2a+25X)×2 :(3a+40X)×2
= a+10X : 2a+25X : 3a + 40X
Given,
$\frac{2a+25X}{3a+40X} = \frac{105}{158}$
316a+3950X=315a+4200X
a=250X
The profit-sharing ratio of last two years
= a+10X : 2a+25X : 3a + 40X
= 260X : 525X : 790X
= 52 : 105 : 158
Profit received by Q = $\frac{105}{52+105+158} \times 3150 = Rs1050$
Given, 1050 + 30X = 1650
30X = 600
X =20
a=250X
a = 5000
So, the initial investment of P, Q and R is Rs 5000, Rs 10000 and Rs 15000 respectively.
Total profit received by P = $15X + \frac{52}{52+105+158} \times 3150 = Rs820$
Total profit received by R = $45X + \frac{158}{52+105+158} \times 3150 = Rs2480$
From I. Total profit received by P > Rs 1000 (incorrect)
From II. Total profit received by R < Rs 2200 (incorrect)
From III. Profit of Q for first two years < 600 (incorrect)

Q26. Find the difference between the profit received by P and Q for first two years and the profit received by R for last two year (in Rs)
(a) 550
(b) 680
(c) 470
(d) 720
(e) 540
Ans.(b)
Sol. Let the investment of P, Q and R be a, 2a and 3a respectively

The profit-sharing ratio of first two years
= a×2 :2a×2 :3a×2
= 1 : 2: 3
Profit of P = 90X×1/6=15X
Profit of Q = 90X×2/6=30X
Profit of R = 90X×3/6=45X
Each of them kept Rs 5X of the profit
So, Amount of profit reinvested by
P = 15X – 5X = 10X
Q = 30X – 5X = 25X
R = 45X – 5X = 40X
The profit-sharing ratio of last two years
= (a+10X)×2 :(2a+25X)×2 :(3a+40X)×2
= a+10X : 2a+25X : 3a + 40X
Given,
(2a+25X)/(3a+40X)=105/158
316a+3950X=315a+4200X
a=250X
The profit-sharing ratio of last two years
= a+10X : 2a+25X : 3a + 40X
= 260X : 525X : 790X
= 52 : 105 : 158
Profit received by Q = 105/(52+105+158)×3150=Rs 1050
Given, 1050 + 30X = 1650
30X = 600
X =20
a=250X
a = 5000
So, the initial investment of P, Q and R is Rs 5000, Rs 10000 and Rs 15000 respectively.
Total profit received by P = 15X + 52/(52+105+158)×3150=Rs 820
Total profit received by R = 45X + 158/(52+105+158)×3150=Rs 2480
The profit received by P and Q for first two years = 15X+ 30X = 45X
= Rs 900
The profit received by R for last two year = 158/(52+105+158)×3150=Rs 1580
Required difference = 1580 – 900 = Rs 680

Q27. Three boats P, Q, and R in a same river. Still water speed of boat Q is more than boat P and boat P can cover '5d' km in still water in $\frac{5}{2}$ hours. The still water speed of boat R is '10d'% more than boat Q and it cover 'd' km more upstream distance than boat Q in each hour. If the speed of boat P in still water is 6 km/hr, then find the still water speed of boat R.
(a) 6
(b) 7
(c) 13
(d) 7.5
(e) 8

Ans.(c)

Sol.

From questions we can say, the sequence of still water speed of these three boats will be R > Q > P

Let still water speed (in km/hr) of boat P, Q and R be x, y and z respectively, and speed of river be 's' km/hr

ATQ, $x = \frac{5d \times 2}{5} = 2d$ km/hr

$z = y + y \times \frac{10d}{100}$

$z - y = \frac{yd}{10}$ ------- (i)

Also given, (z-s) – (y-s) = d

z – y = d ------ (ii)

From (i) and (ii)

$\frac{yd}{10} = d$

y = 10

Given, x = 6 = 2d

d = 3

So, still water speed of boat R = 10 +3 = 13 km/hr

Q28. The question consists of three statements numbered "I, II & III" given below it. You have to choose the data provided in the statements which is not required to answer the question.

The average of age of four friends A, B, C, and D is 40 years, find the age of B.

Statement-I: The average of age of A and B 2.5 years hence will be 35 years, and the ratio of present age of C to age of D is 12:7.

Statement-II: Average age of A and B is 15 years less than the average age of C and D.

Statement-III: The average of age of B and D is 30 years.

(a) Only I

(b) Only II

(c) Both I & II

(d) Both I & III

(e) None of these

Ans.(b)

Sol. Let the present ages of A, B, C & D be a, b, c & d years respectively.

a + b + c + d = 160

From statement I:

a + b = 32.5×2=65

Let c = 12x & d = 7x

From statement II:

$\frac{c+d}{2} - \frac{a+b}{2} = 15$

c + d – a – b = 30

From statement III:

b + d = 60

Both I & III together

a + b + c + d = 160

65 + 19x = 160

x = 5

d = 7x = 35

b = 60 -d = 60-35 = 25

Directions (29-30): Read the information carefully and answer the following questions.

Column I	Column II	Column III
(i) Cylinder	A. Radius = 7 cm	P. Volume = 147 cubic cm
(ii) Sphere	B. Radius = 2 cm	Q. Curved surface area = 36 sq. cm
(iii) Cone	C. Height = 2 cm	R. Volume = 32 cubic cm

The difference between volume of sphere and cylinder is 22 cubic cm, the radius of sphere is equal to height of the cylinder and the ratio of height of cylinder to that of radius is 2:3.
Note – The value of pie is 3 and radius of all the structure is different.

Q29. Match the column and find the which of the following relation/s is/are correct.
(I) (i) – C – Q
(II) (i) – C – R
(III) (ii) – B – R
(IV) (iii) – C – Q
(V) (iii) – A – P
(a) (I) & (V)
(b) (I), (III) & (V)
(c) (IV) & (V)
(d) (III) & (II)
(e) (I), (III), Either (IV) or (V)
Ans.(b)
Sol.
Let height of cylinder = 2a = radius of sphere.
So, radius of cylinder = 3a cm.
ATQ,
Volume of sphere = $\frac{4}{3} \times 3 \times 8a^3 = 32a^3$
Volume of cylinder = $3 \times 9a^2 \times 2a = 54a^3$
$54a^3 - 32a^3 = 22$
$a = 1$
Radius of cylinder = 3 cm, height of cylinder = 2 and radius of the sphere = 2 cm.
Volume of sphere = 32 cubic cm and Curved surface area of cylinder = 36 sq. cm
So, radius of cone = 7 cm and volume of 147 cubic cm.
Height of cone = 3 cm.

Q30. Find the height of the cone (in cm).
(a) 6
(b) 9
(c) 3
(d) 10
(e) 12
Ans.(c)
Sol. So, radius of cone = 7 cm and volume of 147 cubic cm.
Height of cone = 3 cm.